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FURTHER VALIDATION AND METHODOLOGICAL EXTENSION OF TEN A PRIORI SEMANTIC FEATURES FOR INTERPERSONAL VERBS AND ADVERBS

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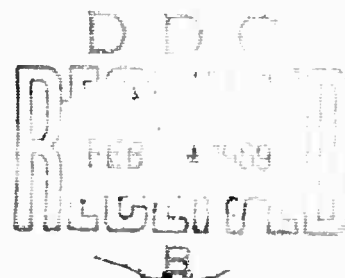
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Communication, Cooperation, and Negotiation in Culturally Heterogeneous Groups
Project Supported by the Advanced Research Projects Agency, ARPA Order No. 454
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FRED E. FIEDLER AND HARRY C. TRIANDIS

Principal Investigators

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Further Validation and Methodological Extension of Ten A Priori
Semantic Features for Interpersonal Verbs and Adverbs

Charles E. Osgood and Judith Goodrich Ayer

Institute of Communications
University of Illinois

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Charles E. Osgood and Judith Goodrich Ayer

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Abstract

The present paper extends and further validates Osgood's model of interpersonal intentions as represented in ten a priori Semantic Features. This model and several cross-cultural implications are discussed.

Several empirical tests were made of the perception and use of these a priori Semantic Features for Interpersonal Verbs by native speakers from the American Midwest subculture. The results showed that with or without instruction, English speakers differentiated five or six of the ten a priori features. The features received different stress depending upon the form class, verb or adverb; morality and deliberateness was stressed in the adverb factors, while different types of association were stressed in the verb factors. Also, the features emerging in the adverb analysis tended to be unipolar, while the verbs produced bipolar features. Various analyses of a feature scaling task show that subjects can use the a priori features to discriminate semantically among interpersonal verbs and do so with almost total agreement with prior feature ratings made for each verb by the authors.

Finally, a computerized aid to checking intuitive judgments about the feature specification of verbs and adverbs and models of semantic systems is described.

FURTHER VALIDATION AND METHODOLOGICAL EXTENSION OF TEN A PRIORI
SEMANTIC FEATURES FOR INTERPERSONAL VERBS AND ADVERBS¹

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In an earlier report (Osgood, 1966) it was suggested that the dimensional structure of interpersonal intentions might comprise a universal system of semantic features. If a common system for dimensionalizing interpersonal behavior, or a common structure of interpersonal intentions, could be demonstrated, then comparisons across groups could be made in a reasonably rigorous and meaningful way. Relying upon his own intuitions as a native speaker of English, the first author arrived at a set of ten semantic features which satisfactorily discriminated among 198 English interpersonal verbs. There were: Moral/Immoral, (e.g., protect vs. deceive); Potent/Impotent, (e.g., support vs. apologize); Active/Passive (e.g., manipulate vs. profit from); Associative /Dissociative, (e.g., invite vs. reject); Initiating/Reacting, (e.g., provoke vs. frustrate); Ego/Alter, (e.g., explicit vs. corrupt); Supraordinate/Subordinate, (e.g., demand vs. comply); Terminal/Interterminal, (e.g., praise vs. admire); Future/Past, (e.g., pledge vs. apologize); Deliberate/Impulsive, (e.g., guide vs. inspire).

These semantic features are associated with a generalized mediation model for interpersonal perception and behavior. (Osgood, 1968) outlines this model as follows:

¹The research reported in this paper was supported by the Advanced Research Projects Agency, ARPA Order No. 454 under Office of Naval Research Contract NR 177-472, Nonr 1834(36), Fred E. Fiedler and Harry C. Triandis, Principal Investigators.

"I assume that mature and participating members of any language-culture community have developed an elaborate set of symbolic processes (r ----- s) for which the antecedents are the perceived and interpersonal behaviors of others (B's) in certain situational contexts (S's) and for which the subsequents are interpersonal behaviors of the individual himself, also dependent upon situational contexts. As dependent events, these symbolic processes (thoughts) will be termed significances (i.e., interpretations of the behaviors of others); as antecedent events, the same symbolic processes (thoughts) will be termed intentions (i.e., motivations of behaviors toward others). It is apparent that the significance attributed by A to the perceived behavior of B as A's inference about the intention of B -- and, of course, it may be quite wrong, particularly in the interactions of people from different cultures.

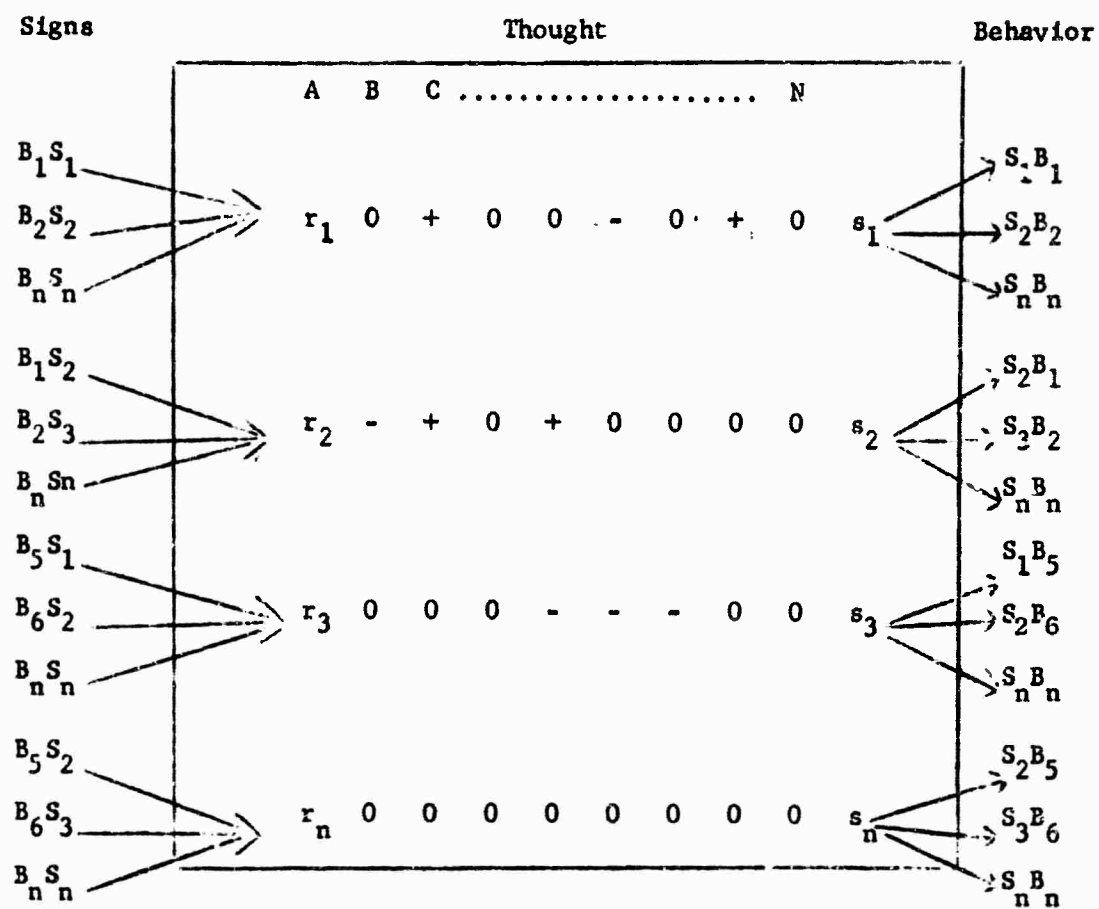
Like other semantic processes or meanings, it is assumed that each significance/intention (r ----- s) can be characterized as a simultaneous bundle of distinctive semantic features (A, B, C . . . N in the Figure). I conceive of these features behaviorally, as a simultaneous set of events in N reciprocally antagonistic reaction systems. They may also be represented by a code-s.rip, as in Figure 1. For convenience in exposition, it is here assumed that codings on features are discrete, all-or-nothing; the probability of the matter is that continuous coding is the general case and discrete coding the special case."

Various combinations of a small set of such features (perhaps not many more than the ten suggested here) can generate a very large number of significance intention processes. It is assumed that in any language the words used to talk about interpersonal behaviors will be coded on the same semantic features as the perceived behaviors themselves. That is, to a large degree linguistic and perceptual signs utilize the same semantic feature system. The linguistic sign will, of course, be an abstraction from the act-as-perceived, the perceptual sign being more unique and richer in meaning. Words sacrifice semantic richness to achieve generality of usage.

Such semantic features may provide a means of comparing the values, attitudes, meanings and norms of interpersonal behavior across languages and cultures. Any such comparison requires that something be held in

Figure 1

A Mediation Model of Interpersonal Behavior



common. In the domain of interpersonal relations neither the overt expressions of intentions nor the appropriateness of particular intentions for particular role-pairs are shared across human groups. Neither is the exact set of intentions themselves likely to be shared -- as culturally defined roles vary, so may the types of intentions. The most likely constant in this domain would seem to be the dimensional feature structure of the intentions themselves. Thus, we might expect all human groups to distinguish between Associative and Dissociative intentions (Helping vs. Hindering), between supraordinate and Subordinate intentions (Dominating vs. Submitting), etc. -- simply because they are humans. If such a common feature system would be demonstrated, then comparisons across groups could be made in a reasonably vigorous way.

The "meaning" of a linguistic or perceptual sign will be characterized as a "simultaneous bundle of distinctive semantic features," in much the same way that Jakobson and Halle (1956) and others after them have characterized phonemes as simultaneous bundles of distinctive phonetic features. The present paper reports several empirical tests of the perception and use of ten a priori features of interpersonal verbs by native speakers from the American midwest subculture, as well as a computerized aid to checking intuitive judgments about the feature specifications of verbs and adverbs.

THE SEMANTIC GAME

The data used in this report were generated in the context of a group dynamics experiment. One problem in group dynamics has been that tests used to determine the cognitive similarities and differences among

members of groups seldom if ever bear any direct relations to the group task used to measure group performance. An interpersonal verb (IPV)/adverb (AV) interjection test was used as a measure of semantic (cognitive) similarity in order to assemble different types of three-person groups in which the members were related to one another with various degrees of "semantic closeness."

Thirty of a set of forty interpersonal verbs were used in both the IPV/AV interaction task and the group task -- a "semantic game" in which the three group members were required to be unanimous in their final placement of 39 interpersonal verbs upon a target of ten concentric circles, with the verb "to confuse" in the bullseye. The verbs were printed on 1 1/2 inch labeling tags, and these were easily pinned, removed and repinned by the members on a cork-board backed target. The task was to arrange all 39 verbs into "dimensions of meaning" either passing through the center verb (bipolar dimension) or originating at the origin (unipolar). The color-wheel was used as a direct analogy of the semantic task: The 40th verb "confuse" was said to approximate "neutral gray" at the center of the target, and the more a word was placed toward the outer rim of the board the more "saturated" it was said to be in its particular meaning dimension; similar semantic dimensions were placed near one another as neighboring "hues." The groups were given unlimited time to complete this task. An audio tape recording was made of each group interaction, along with a running sub voce commentary by the experimenter to identify the speakers and record their non-verbalized actions.

Immediately after the game group members filled out a questionnaire on their reactions to the game; e.g., involvement, pleasantness of the task, difficulty, group atmosphere. They also were carefully instructed on a feature scaling task which each member completed alone at home. This task required the subject to scale (+3 to -3) each interpersonal verb used in the game on each of the ten a priori semantic features.

In summary, the procedure involved three major stages: (1) a pretest, IPV/AV intersection task on the basis of which the groups were assembled; (2) a creative semantic game group task involving 30 of the same verbs as the pretest; (3) a semantic-feature scaling task. The detailed procedures for the pretest and posttest, which are basis for this report, follow.

PROCEDURE

Selection of Interpersonal Verbs

The final list of 198 Interpersonal Verbs reported by Osgood (1966) was the source of the 40 verbs used in the present study. For the purposes of the present study the 40 verbs were to be selected so that the a priori feature coding assignments would be balanced (i.e., the number of assignments to each pole +, - and 0 on that feature would be equal over all the verbs for each feature) and as equally intercorrelated as possible. In order to randomize the selection of the verbs as much as possible, the following procedure² was used to select 13 pairs of 3 verbs: (a) select a feature (1-10) at random not already selected i.e., sample features without replacement and begin again; (b) enter a random

²We are indebted to Dr. Marilyn Wilkins for devising this method and assisting in the selection of the adverbs.

number table according to some rule and select the first number between 1-198 and accept the corresponding verb on Osgood's original list if it had either a + (plus) or - (minus) designation on the feature being considered; if not continue down the table until such a verb is selected-- for example betray was so selected because it was - (or Dissociative) on the Associative/Dissociative feature; (c) list the feature assigned for the selected verb and find a verb which is coded on the opposite pole of the target feature and which also has the closest match to the original verb on all other feature codings; (d) find a verb which has the same coding on the target feature as the first verb and also has as many opposite codings on all other features. The triad including betray appeared as follows:

	A	B	C	D [*]	E	F	G	H	I	J
betray	-	0	0	-	+	0	0	+	-	0
confide in	0	0	0	+	+	+	0	+	-	0
resist	0	0	0	-	-	+	0	-	+	0

The starred feature was the target feature, Associative/Dissociative.

The final 39 verbs were selected, after some minor changes in this way. The list of these verbs together with their original feature assignment appears in Table 1. The fortieth verb, to confuse, was selected because it had the smallest number of (plus) or (minus) values assigned to the features, and therefore was analogous to the neutral grey in the color solid.

Table 1

Earliest Feature Assignments of Three Values (+ 0 -)^a on Ten a priori

Features to the 40 Selected Interpersonal Verbs

Verb ^b	Moral- Immoral	Potent- Impotent	Active- Passive	Associative- Disociative	Initiating- Reacting	Ego- Alter	Supraordinate Subordinate	Terminal- Interterminal	Future- Past	Deliberate- Impulsive
	A	B	C	D	E	F	G	H	I	J
accept	0	0	-	+	-	0	+	0	0	0
advise	0	0	0	0	+	-	+	+	+	+
ambush	-	0	+	-	+	+	0	+	0	+
appease	-	-	-	+	-	-	0	+	-	0
argue with	0	0	+	-	0	0	0	0	0	+
be submissive to	0	-	-	0	-	-	-	-	0	-
betray	-	0	0	-	+	0	0	+	-	0
bully	-	+	+	-	+	0	+	0	0	-
cheat	-	-	0	-	0	+	0	0	0	0
compete with	0	+	+	0	0	+	0	-	+	0
confess to	0	-	+	0	0	+	-	+	-	0
confide in(to)	0	0	0	+	+	+	0	+	-	0
confine	0	0	0	-	0	-	+	-	0	+
confuse	0	0	0	0	0	-	+	0	0	0
console	+	0	0	+	-	-	0	0	-	-
convert	0	0	0	0	+	-	+	+	+	+
court	0	0	+	+	+	+	-	-	+	+
defy	0	+	+	-	-	+	-	0	+	-
depreciate	0	-	0	-	0	+	+	+	-	+
disregard	0	0	-	-	-	0	0	-	0	0

Table 1 (continued)

Verb ^b	Moral- Immoral A	Potent- Impotent B	Active- Passive C	Associative- Dissociative D	Initiating- Reacting E	Ego- Alter F	Supraordinate- Subordinate G	Terminal- Interterminal H	Future- Past I	Deliberate- Impulsive J
distress	0	+	+	-	+	-	0	0	0	-
embarrass	0	0	0	-	+	-	+	+	-	-
evade	0	-	+	-	-	+	-	0	-	0
exclude	0	0	0	-	0	0	+	-	0	0
harrass	-	+	+	-	+	-	0	-	0	0
hold contempt for	0	+	0	-	-	-	+	-	-	+
molest	-	0	+	-	+	+	+	+	0	0
obey	+	-	0	+	-	-	-	+	-	0
pay attention to	0	0	0	+	-	0	-	0	0	+
plead with	0	-	+	0	+	+	-	0	+	-
promise	0	-	0	+	0	0	-	+	+	+
reassure	0	+	0	+	-	-	+	+	-	-
reform	+	0	0	0	+	-	+	0	+	+
refute	0	0	0	-	-	-	+	+	-	+
resist	0	0	0	-	-	+	0	-	+	0
seduce	-	+	0	+	+	+	+	-	+	+
serve	0	-	+	+	0	-	-	0	0	+
share with	0	0	0	+	0	0	0	-	0	-
spurn	0	+	+	-	-	0	+	+	0	-
train	0	0	0	0	+	-	+	-	+	+

^a + indicates that verb has the meaning of the first pole of the bipolar feature, e.g., Associative/Dissociative
 - indicates that verb has the meaning of the second pole of the feature, e.g., Associative/Dissociative
 0 indicates that the verb has no value on that feature

Table 1 (continued)

^bIn assigning the values to the features, all verbs are viewed from the context A $\xrightarrow{\text{verb}}$ B where the intention of the actor, A, determines the meaning.

The distribution of the codings on each feature for these verbs was:

Feature	Frequency Assigned		
	+	0	-
A Moral/Immoral	3	29	8
B Potent/Impotent	9	21	10
C Active/Passive	15	21	4
D Associative/Dissociative	12	9	19
E Initiating/Reactive	15	11	14
F Ego-oriented/Alter-oriented	13	10	17
G Supraordinate/Subordinate	17	13	10
H Terminal/Interterminal	15	13	12
I Future-oriented/Past-oriented	11	17	12
J Deliberate/Impulsive	15	15	10

It is clear that, despite our effort, we failed to balance the a priori feature assignments evenly; the features Moral/Immoral and Active/Passive show the most extreme imbalance. However, an original set of 198 interpersonal verbs is a small sample. The intercorrelations among the 10 a priori features for the selected 40 verbs appear in Table 2.

Selection o. the Adverbs

It was decided that the best way to select the most fitting adverb for each of the verbs would be to ask a sample of our subject population. Fifty-seven college students (21 men from the introductory psychology courses and 9 men from Honors English courses; 13 women from introductory psychology courses and 14 women from Honors English courses) were given the list of 40 Interpersonal verbs in random order. In the blank space to the right

Table 2

Intercorrelations Among the a priori Feature Assignments for the
Selected Set of 40 Interpersonal Verbs

[illegible]

of each verb they were asked to write the "best fitting" adverb or the one which best identified or highlighted the meaning of the verb. The subjects were asked to place the verbs into the frame A $\xrightarrow{\text{verb}}$ B, where the intention of the actor A determined the meaning of the verb.

The adverbs encoded by those students were as individual as the subjects. The adverbs elicited by each verb were grouped according to the a priori feature of group of features which the authors thought were expressed in common. Quality adverbs (e.g., well, poorly, skillfully) adverbs of Frequency or rate (e.g., quickly, frequently, constantly) adverbs of time (e.g., immediately, wholly, partially, entirely) were also listed and eliminated from consideration. Only 15 adverbs of the total 2,280 elicited were judged to be anomalous. Examples of some of these anomalous verb/adverb pairings are: to plead with mercifully (Supraordinate/Subordinate feature in conflict); to distress helplessly (Potent/Impotent feature in conflict); to spurn demandingly (Associative/Dissociative feature in conflict). It is interesting that such a small proportion of anomalies occurred in this encoding task; the occurrence of such anomalies in speech is rare, and when they do occur they are immediately corrected or corrected if brought to the speakers attention.³

After the adverbs had been grouped into these various classes, the authors selected the most frequent adverb, or one adverb from the most frequently occurring feature group. This procedure resulted in the selection of the 30 "best-fitting" verb-adverb pairs listed in Table 3. But these adverbs would not necessarily be "best-fitting" with other verbs in our sample.

³ These anomalies are not likely to occur or to be accepted in the encoding task, but may frequently be accepted in decoding tasks.

Table 3

Verb/Adverb Pairs used in the IPV/AV Intersection Test

1. to evade	furtively
2. to refute	adamantly
3. to confine	strictly
4. to accept	willingly
5. to argue with	heatedly
6. to betray	deceitfully
7. to harrass	incessantly
8. to confide in	trustingly
9. to molest	brutally
10. to cheat	unscrupulously
11. to seduce	slyly
12. to obey	unquestioningly
13. to compete with	vigorously
14. to pay attention to	carefully
15. to bully	meanly
16. to confess to	remorsefully
17. to reassure	confidentially
18. to disregard	flagrantly
19. to console	sympathetically
20. to serve	faithfully
21. to advise	wisely
22. to court	hopefully
23. to promise	sincerely
24. to be submissive to	meekly

Table 3 (continued)

25. to spurn	contemptuously
26. to resist	stubbornly
27. to share with	generously
28. to defy	boldly
29. to plead with	humbly
30. to exclude	snobbishly

All possible combinations of these 30 verbs and adverbs comprised the 900 pairs for the IPV/AV pretest.

Procedure with the IPV/AV Pretest

Forty-two of the students participating in the adverb elicitation task volunteered to continue with the experiment. All subjects were paid \$1.50 per hour for participating in this stage and any further stages of the experiment. The IPV/AV intersection task was administered to the subjects as a group. The instructions were given orally by the first author.

The subjects were told to indicate one of three types of judgments for each verb/adverb pair on the adjacent space. The pair is apposite or fitting (+); nonsense or anomalous (-); or merely permissible in English (0). The judgment was to be made in the A ~~verb~~ B frame where the meaning was determined by the actor's (A's) intention. Examples of each type of judgment were given to the group and discussed until there were no further questions. The examples were: "he attacked violently" (+); "he attacked quickly" (0); "he attacked meekly" (-). It was stressed that the judgments should be based on the common meanings of the words and not in terms of possible metaphors or poetic usage. The subjects were instructed to work completely through their booklets once, making only the anomalous or minus judgments; take a 10 minute break, and then fill in the apposite (+) and permissible (0) judgments. The subjects were given as much time as necessary to complete the task. Nearly all finished within an hour and a half.

Assignment of the a priori Features to the Adverbs

The codings of each of the ten a priori features for each adverb were assigned on the basis of the mean judgments by six of the staff and graduate

students at the Center for Comparative Psycholinguistics. For those instances where the individual judgments were tied among two values or were balanced among the three alternatives, the two authors argued until one agreed or surrendered. The final feature codings for each adverb appear in Table 4.

Semantic Feature Scaling Task

Each of the 36 players of the semantic game were instructed on the meaning of each of the 10 a priori features and semantic differential scaling instructions prior to scaling each of the 40 interpersonal verbs on scales of each of the features of the form:

I deliberate: $\frac{\text{to confess to}}{3} : \frac{\text{to confess to}}{2} : \frac{\text{to confess to}}{1} : 0 : \frac{\text{to confess to}}{1} : \frac{\text{to confess to}}{2} : \frac{\text{to confess to}}{3}$: impulsive

II moral : $\frac{\text{to confess to}}{3} : \frac{\text{to confess to}}{2} : \frac{\text{to confess to}}{1} : 0 : \frac{\text{to confess to}}{1} : \frac{\text{to confess to}}{2} : \frac{\text{to confess to}}{3}$: immoral

The complete instructions with the definitions of each feature and examples, together with one of the response sheets, appear in Appendix A.

RESULTS AND DISCUSSION

"Discovery" of the Features by Factor Analysis

IVP/AV intersection task. The responses of the subjects to the IPV/AV task were entered into a rectangular matrix, with the columns defined by the 30 verbs and the rows defined by the 30 adverbs. From this data matrix the principle axes of the adverb/adverb and verb/verb correlation matrices (obverse analysis of the first) were rotated orthogonally with the Varimax rotation. These factor analyses cluster together those verbs and adverbs, indexed by large factor loadings, which share certain

Table 4

Alphabetical Listing of Adverbs and a priori code

	Moral- Immoral	Potent- Impotent	Active- Passive	Associative- Dissociative	Initiating Reacting	Ego- Alter	Supraordinate- Subordinate	Terminal- Internal	Future- Past	Deliberate- Impulsive
	A	B	C	D	E	F	G	H	I	J
Adamantly	0	+	0	0	0	0	+	-	0	0
Boldly	0	+	0	0	+	+	0	0	0	-
Brutally	-	+	+	-	0	-	+	0	0	0
Carefully	0	0	0	0	0	0	0	0	+	+
Confidently	0	0	0	0	+	0	0	0	+	0
Contemptuously	0	0	0	0	-	0	+	0	0	0
Deceitfully	-	0	0	0	0	0	0	0	0	+
Faithfully	+	0	0	+	-	0	0	-	0	0
Flagrantly	-	0	+	0	0	0	0	0	0	0
Furtively	-	-	0	0	0	-	-	0	+	+
Generously	+	0	0	+	0	-	+	0	0	-
Heatedly	0	+	+	0	0	0	0	+	0	-
Hopefully	0	0	0	0	0	0	0	-	+	0
Humbly	+	-	0	0	0	0	-	0	0	0
Incessantly	0	0	+	0	0	0	0	-	0	0
Meanly	-	0	0	-	0	0	0	0	0	0
Meekly	0	-	0	0	0	0	-	0	0	0

[illegible]

characteristics in usage. It is not necessary that the same, or even a single, semantic feature produce such clusters. Since orthogonal solutions were obtained, these characteristics are independent of one another. In order to judge whether the a priori features contributed to these factor clusters, the highest loading verbs and adverbs were listed together with their loading on each factor and the a priori values for each feature. If a particular value of a feature shows a consistent pattern (+ or -) for the high loading words and the opposite value for the negative loading words, it can be inferred that a particular feature may have contributed to the factor clustering being considered. Table 5 gives these data for the adverbs; Table 6 gives the same data for the verbs.

The factor analysis of the adverb/adverb correlation matrix resulted in six factors accounting for 86.51% of the total variance. Factor I, which accounted for 25.75% of the total variance, appears to be the expression of two features, Associative/Dissociative and Moral/Immoral. The positively loading adverbs express moral association, for example, sincerely, sympathetically, faithfully, while the negatively loading adverbs express Immoral/Dissociation, for example, meanly, brutally, contemptuously. Adverb Factor II, which accounted for 18.54% of the total variance, seems to be an expression of the potent end of the Potent/Impotent feature with high loading adverbs: adamantly, vigorously and stubbornly. Adverb Factor III, accounting for 11.42% of the total variance, appears to express primarily the Moral/Immoral features. The positively loading adverbs, furtively, slyly, deceitfully, unscrupulously, express a Deliberate Immorality, while the negatively loading adverbs are Impulsively

Table 5

Factor Analysis of the Adverbs in The IPV Interaction Task

		Moral- Immoral	Potent Impotent	Active Passive	Associative- Dissociative	Initiating- Reacting	Ego- Alter	Supraordinate Subordinate	Terminal- Interterminal	Future- Past	Deliberate- Impulsive
		A	B	C	D	E	F	G	H	I	J
<u>Factor I</u>	Loading *				*						
sincerely	.87	+	0	0	0	0	0	0	0	0	0
hopefully	.83	0	0	0	0	0	0	0	-	+	0
confidently	.70	0	0	0	0	+	0	0	0	+	0
sympathetically	.68	+	0	0	+	-	-	0	0	-	0
faithfully	.64	+	0	0	+	-	0	0	-	0	0
meanly	-.80	-	0	0	-	0	0	0	0	0	0
brutally	-.73	-	+	+	-	0	-	+	0	0	0
contemptuously	-.72	0	0	0	0	-	0	+	0	0	0
<u>Factor II</u>		?	*								
adamantly	.90	0	+	0	0	0	0	+	-	0	0
vigorously	.89	0	+	+	0	0	0	0	0	0	0
stubbornly	.83	0	0	0	0	0	+	0	-	0	0
sympathetically	.36	+	0	0	+	-	-	0	0	-	0
remorsefully	-.35	+	0	0	0	0	+	0	0	-	-
trustingly	-.32	+	0	0	+	0	0	-	0	0	0

Table 5 (continued)

		Moral- Immoral	Potent- Impotent	Active Passive	Associative- Dissociative	Initiating- Reacting	Ego- Alter	Supraordinate- Subordinate	Terminal- Interterminal	Future- Past	Deliberate- Impulsive
		A	B	C	D	E	F	G	H	I	J
<u>Factor III</u>	Loading	*									*
furtively	.93	-	-	0	0	0	-	-	0	+	+
slyly	.89	-	0	0	0	+	0	0	0	0	+
deceitfully	.85	-	0	0	0	0	0	0	0	0	+
unscrupulously	.45	-	0	0	0	0	0	0	0	0	0
sympathetically	-.32	+	0	0	+	-	-	0	0	-	0
humbly	-.27	+	-	0	0	0	0	-	0	0	0
unquestioningly	-.27	0	0	-	0	-	-	-	0	0	0
trustingly	-.24	+	0	0	+	0	0	-	0	0	0
<u>Factor IV</u>											*
Unscrupulously	.46	-	0	0	0	0	0	0	0	0	0
brutally	.33	-	+	+	-	0	-	+	0	0	0
incessantly	.24	0	0	+	0	0	0	0	-	0	0
strictly	-.81	0	+	0	0	0	-	+	0	0	+
carefully	-.70	0	0	0	0	0	0	0	0	+	+
wisely	-.70	0	0	0	0	0	0	0	0	0	+
snobbishly	-.45	-	0	0	0	0	0	+	0	0	+

Table 5 (continued)

		Moral- Immoral	Potent- Impotent	Active Passive	Associative- Dissociative	Initiating- Reacting	Ego- Alter	Supraordinate- Subordinate	Terminal- Interterminal	Future- Past	Deliberate- Impulsive
		A	B	C	D	E	F	G	H	I	J
<u>Factor V</u>	<u>Loading</u>	*						*			
brutually	.39	-	+	+	-	0	-	+	0	0	0
unscrupulously	.34	-	0	0	0	0	0	0	0	0	0
deceitfully	.32	-	0	0	0	0	0	0	0	0	+
meanly	.31	-	0	0	-	0	0	0	0	0	0
remorsefully	-.78	+	0	0	0	0	+	0	0	-	-
meekly	-.71	0	-	0	0	0	0	-	0	0	0
humbly	-.60	+	-	0	0	0	0	-	0	0	0
<u>Factor VI</u>											
incessantly	.33	0	0	+	0	0	0	0	-	0	0
heatedly	.26	0	+	+	0	0	0	0	+	0	-
slyly	.25	-	0	0	0	+	0	0	0	0	+
willingly	-.80	0	0	0	0	-	0	-	0	0	0
unquestioningly	-.77	0	0	-	0	-	-	-	0	0	0
faithfully	-.60	+	0	0	+	-	0	0	-	0	0
trustingly	-.60	+	0	0	+	0	0	-	0	0	0
generously	-.56	+	0	0	+	0	-	+	0	0	-
confidently	-.41	0	0	0	0	+	0	0	0	+	0
meckly	-.40	0	-	0	0	0	0	-	0	0	0

Table 6

Factor Analysis of the Interpersonal Verbs in the IPV/AV Intersections Task

		Moral- Immoral	Potent- Impotent	Active- Passive	Associative- Dissociative	Initiating- Reacting	Ego- Alter	Supraordinate- Subordinate	Terminal- Interminal	Future- Past	Deliberate Impulsive
		A	B	C	D	E	F	G	H	I	J
<u>Factor I</u>	<u>Loading</u>		*		?			*			
spurn	.27	0	+	+	-	-	0	+	+	0	-
bully	.24	-	+	+	-	+	0	+	0	0	0
harrass	.24	-	+	+	-	+	-	0	-	0	0
be submissive to	-.70	0	-	-	0	-	-	-	-	0	0
accept	-.87	0	0	-	+	-	0	0	0	0	0
obey	-.83	0	-	0	0	-	0	-	0	0	0
confess to	-.82	+	0	0	0	0	0	-	+	-	0
serve	-.75	0	0	0	+	0	-	-	0	0	0
confide in	-.72	0	-	0	+	+	+	0	+	-	0
<u>Factor II</u>			?		*					?	
share with	.36	0	0	0	+	0	0	0	-	0	0
be submissive to	.30	0	-	-	0	-	-	-	-	0	0
console	.26	+	0	0	+	-	-	0	0	-	-
confide in	.23	0	-	0	+	+	+	0	+	-	0
argue with	-.95	0	0	+	-	0	0	0	0	0	0
refute	-.92	0	+	0	-	-	0	+	+	-	0
resist	-.92	0	0	0	-	-	+	0	-	+	0
defy	-.83	0	+	+	-	-	+	0	0	+	-
compete with	-.83	0	0	+	0	0	+	0	-	+	0

Table 6 (continued)

		Moral- Immoral	Potent- Impotent	Active- Passive	Associative- Dissociative	Initiating- Reacting	Ego- Alter	Supraordinate- Subordinate	Terminal- Interterminal	Future Past	Deliberate- Impulsive
		A	B	C	D	E	F	G	H	I	J
<u>Factor II</u>	Loading										
spurn	-.73	0	+	+	-	-	0	+	+	0	-
<u>Factor III</u>		*			*	*					
seduce	.91	-	0	0	0	+	+	+	0	+	+
cheat	.87	-	0	0	-	+	+	0	0	0	+
betray	.84	-	0	0	-	+	0	0	+	-	+
molest	.73	-	0	+	-	+	+	+	+	0	0
bully	.57	-	+	+	-	+	0	+	0	0	0
harrass	.58	-	+	+	-	+	-	0	-	0	0
pay attention to	-.32	0	0	0	0	-	0	0	0	0	+
obey	-.28	0	-	0	0	-	0	-	0	0	0
console	-.25	+	0	0	+	-	-	0	0	-	-
<u>Factor IV</u>							?	?			
plead with	.65	0	0	0	0	+	+	-	0	+	0
court	.43	0	0	+	+	+	+	0	-	+	0
confess to	.35	+	0	0	0	0	0	-	+	-	0
promise	.33	0	0	0	+	0	0	0	+	+	0
confine	-.76	0	0	0	-	0	0	+	-	0	+
exclude	-.75	0	0	-	-	0	0	+	0	0	0
disregard	-.63	0	0	-	-	-	0	0	-	0	+

Table 6 (continued)

Factor V	Loading	A Moral- Immoral	B Potent- Impotent	C Active- Passive	D Associative- Dissociative	E Initiating- Reacting	F Ego- Alter	G Supraordinate- Subordinate	H Terminal- Interterminal	I Future- Past	J Deliberate- Impulsive
advise	.90	0	0	0	0	+	-	0	0	+	+
reassure	.88	0	+	0	+	-	-	+	+	-	0
console	.74	+	0	0	+	-	-	0	0	-	-
promise	.67	0	0	0	+	0	0	0	+	+	0
court	.58	0	0	+	+	+	+	0	-	+	0
pay attention to	.61	0	0	0	0	-	0	0	0	0	+
confide in	.48	0	-	0	+	+	+	0	+	-	0
bully	-.34	-	+	+	-	+	0	+	0	0	0
spurn	-.33	0	+	+	-	-	0	+	+	0	-
harrass	-.32	-	+	+	-	+	-	0	-	0	0
disregard	-.30	0	0	-	-	-	0	0	-	0	+
betray	-.25	-	0	0	-	+	0	0	+	-	+

Moral, e.g., sympathetically, humbly, trustingly. Adverb Factor IV accounted for 9.35% of the total variance, and it appears to be an expression of the Deliberate pole of the Deliberate/Impulsive feature. The highly negative loading adverbs are all Deliberate, e.g., strictly, carefully, wisely. Factor V accounted for 9.85% of the variance and it is the third adverb factor to express the Moral/Immoral feature, here associated with the Supraordinate/Subordinate feature. The high negatively loading adverbs express Moral Subordination, e.g., remorsefully, meekly, humbly; the positively loading adverbs are Immoral, e.g., brutally, unscrupulously. Factor VI, which accounted for 11.53% of the total variance, does not seem to be the expression of any one or any combination of the ten a priori features. However, the high loading adverbs, clustered at the negative pole, do seem to belong together semantically: The adverbs willingly, unquestioningly, faithfully, trustingly, generously, confidently all seem to express "free-will" or high personal choice. Factor VI thus appears to be a unipolar "willingness" factor.

The six factors emerging from the factor analysis of the adverbs in the IPV/AV intersection task identified one feature primarily, the Moral/Immoral feature, associated variously with groupings of secondary features--Associative/Dissociative, Deliberate/Impulsive, and Supraordinate/Subordinate. Only two other a priori features were isolated, and both of these were unipolar--Potency in Factor II and Deliberateness in Factor IV. The major characteristic of the factor analysis of the adverbs in this type of intersection task was that the adverbs were used as unipolar features; three of the six factors were unipolar, Factor II, Factor IV, and Factor VI.

Table 6 gives the factors identified in the factor analysis of the verb/verb correlation matrix. In this analysis, six factors accounted for 88.33% of the total variance. Factor I accounted for 19.81% of the total variance and clearly identifies an interaction between the Potent/Impotent and Supraordinate/Subordinate features; Potent Supraordinate verbs, e.g., spurn, bully, harrass, contrast with Impotent Subordinate verbs, e.g., be submissive to, obey, confess to, serve. Factor II, accounting for 21.88% of the variance, is clearly an Associative/Dissociative Factor, but with a Potent/Impotent and Future/Past flavor. The positive loading verbs were Associative, Impotent and Past-oriented, e.g., console, confide in, the negatively loading verbs were Dissociative, Potent and, except for refute, Future-oriented, e.g., resist, defy, compete with. Factor III, absorbing 15.06% of the variance accounted for, appears to be the resultant of three features--Moral/Immoral, Associative/Dissociative and Initiating/Reacting. The positive loading verbs were Immoral, Dissociative and Initiating, e.g., cheat, betray, molest, bully; the negatively loading verbs were Moral, Associative and Reacting, e.g., pay attention to, obey, console. Factor IV, accounting for 10.43% of the total variance, appears to reflect the Supraordinate/Subordinate feature with a slight Ego/Alter flavor. The positively loading verbs were Supraordinate; e.g., confine, exclude. The feature identification of this factor is weak at best. Factor V, accounting for 16.26% of the variance, clearly reflects the Associative/Dissociative feature and no other features. The positively loading verbs were Associative, e.g., reassure, console, promise, court; the negatively loading verbs were Dissociative, e.g., bully, spurn, harras, disregard.

Factor VI was not a common factor and accounted for only 4.89% of the total variance.

The factor analysis of the verbs in the IPV/AV intersection task produced clearer feature identification than the analysis of the adverbs; however, with the exception of the Associative/Dissociative feature, the factors seemed to result from clusters of features, Potent-Subordination, Initiated-Immoral-Dissociation, Ego-oriented Subordination and etc. The frequently identified Deliberate/Impulsive feature of the adverb analysis did not appear in the verb analysis, nor did the Moral/Immoral feature appear repeatedly in the verb factors as it did in the adverb factors. The Associative/Dissociative feature appears to be dominant in the verb analysis with Supraordinate/Subordinate, Moral/Immoral, Initiating/ Reacting as secondary features.

The factor analyses of the verbs and adverbs in the IPV/AV Intersection task resulted in the clear and independent identification of only three of the ten a priori features, Associative/Dissociative, Potent/Impotent, and the deliberate pole of the Deliberate-Impulsive feature. The IPV/AV intersection task is essentially a decoding test of the semantic constraints operating between the verb and adverb pairs when forced into all possible combinations. Such "acceptability vs. anomaly" judgments may not be the best task for isolating individual semantic features. It is possible that the same features may receive different stress depending upon the form class, verb or adverb, thus not allowing the underlying features to emerge in factor analyses of such data; for example, adverbs may be more richly coded to express types of morality or deliberateness while verbs stress different types of association. In fact, there is some

evidence in the preceeding data that the features were used in the two form classes differently; the adverb factors tended to be unipolar, and the adverb analysis identified different features and feature clusters than the verb analysis, e.g., the Moral/Immoral feature seemed primary in the adverb analysis while the Associative/Dissociative feature was primary in the verb analysis.

Feature scaling task. It is possible that the a priori features would have a better chance of being isolated in a task which required discrimination among the ten a priori features for each lexical item. The post-test feature scaling task is such a task; the subjects were carefully instructed on the meaning of each feature and asked to use the features themselves as scales to describe the meaning of each verb. The question, then, is whether or not "ordinary" native speakers after being given explicit instructions on the a priori features can use them to differentiate the meanings of words consistently and in agreement with the codings of "experts." Table 7 gives the results of the factor analysis of the 40 verbs in the post-test feature scaling task. Eight factors accounted for a total of 99% of the total variance. Several features appear clearly and independently: Ego/Alter (Factor III), Supra-ordinate/Subordinate (Factor IV), Future/Past (Factor VIII) and Initiating/Reacting (Factor VII). Factor I which accounted for the most variance, 23.13% of the total, involved the dominate Associative/Dissociative feature, fused with Moral/Immoral, Impulsive/Deliberate and particularly Reacting/Initiating features. In the semantics of these Subjects, Associative behaviors tend to be Moral, Impulsive and Reactive, while the converse holds for Dissociative behaviors. Factor II, accounting for

Table 7

Factor Analysis of Feature Scaling Data

	A	B	C	D	E	F	G	H	I	J
	Moral Immoral ?	Potent Impotent	Active Passive	Associative Dissociative *	Initiating Reacting *	Ego Alter	Supra Sub	Terminal Interterminal	Future Past	Deliberate Impulsive ?
Factor I										
Loading										
molest	-	+	+	-	+	0	+	0	0	0
ambush	-	0	0	-	+	+	0	+	0	+
betray	-	0	0	-	+	0	0	+	-	+
cheat	-	0	0	-	+	+	0	0	0	+
seduce	-	0	0	0	+	+	+	0	+	+
bully	-	+	+	-	+	0	+	0	0	0
embarrass	0	0	0	-	+	-	-	0	-	0
reassure	0	+	0	+	-	-	+	+	-	0
accept	0	0	-	+	-	0	0	0	0	0
console	+	0	0	+	-	-	0	0	-	-
share with	0	0	0	+	0	0	0	-	0	0
Factor II										
resist	0	0	0	-	-	+	0	-	+	0
defy	0	+	+	-	-	+	0	0	+	-
compete with	0	0	+	0	0	+	0	-	+	0
hold contempt for	0	+	0	0	-	-	+	-	-	0
spurn	0	+	+	-	-	0	+	+	0	-

Table 7 (continued)

Factor II	Loading	A	B	C	D	E	F	G	H	I	J
		Moral Immoral	Potent Impotent	Active Passive	Associative Dissociative	Initiating Reacting	Ego Alter	Supra- Sub	Terminal Interterminal	Future Past	Deliberate Impulsive
refute	.56	0	+	0	-	-	0	+	+	-	0
share with	-.16	0	0	0	+	0	0	0	-	0	0
confide in	-.16	0	-	0	+	+	+	0	+	-	0
be submissive	-.14	0	-	-	0	-	-	-	-	0	0
<u>Factor III</u>											
advise	.79	0	0	0	0	+	-	0	0	+	+
console	.71	+	0	0	+	-	-	0	0	-	-
reform	.70	+	0	0	0	+	-	+	0	0	+
reassure	.70	0	+	0	+	-	-	+	+	-	0
convert	.64	0	0	0	0	+	-	+	+	+	0
train	.62	0	0	0	0	+	-	+	-	+	+
share with	.60	0	0	0	+	0	0	0	-	0	0
cheat	-.24	-	0	0	-	+	+	0	0	0	+
confess to	-.17	+	0	0	0	0	0	-	+	-	0
evade	-.14	0	-	+	-	-	+	0	0	0	0

Table 7 (continued)

Table 7 (continued)

Factor V	Loading	A Moral Immoral	B Potent Impotent	C Active Passive	D Associative Dissociative	E Initiating Reacting	F Ego Alter	G Supra Sub	H Terminal Interterminal	I Future Past	J Deliberate Impulsive
console	.39	+	0	0	+	-	-	0	0	-	-
share with	.35	0	0	0	+	0	0	0	-	0	0
reform	-.28	+	0	0	0	+	-	+	0	0	+
train	-.33	0	0	0	0	+	-	+	-	+	+
harrass	-.27	-	+	+	-	+	-	0	-	0	0
bully	-.23	-	+	+	-	+	0	+	0	0	0
convert	-.21	0	0	0	0	+	-	+	+	+	0
<u>Factor VI</u>											
	Loading				?			?		?	
disregard	.64	0	0	-	-	-	0	0	-	0	+
exclude	.40	0	0	-	-	0	0	+	0	0	0
hold contempt for	.30	0	+	0	0	-	-	+	-	-	0
depreciate	.26	0	0	0	-	0	0	+	0	-	+
plead with	-.60	0	0	0	0	+	+	-	0	+	0
serve	-.50	0	0	0	+	0	-	-	0	0	0
court	-.31	0	0	+	+	+	+	0	-	+	0
obey	-.25	0	-	0	0	-	0	-	0	0	0

Table 7 (continued)

Factor VII	Loading	A	B	C	D	E	F	G	H	I	J
		Moral Immoral	Potent Impotent	Active Passive	Associative Dissociative	Initiating Reacting *	Ego Alter	Supra Sub	Terminal Interterminal	Future Past	Deliberate Impulsive
confuse	.77	0	0	0	0	+	-	0	0	0	0
distress	.57	0	0	0	-	+	-	0	0	0	0
embarrass	.41	0	0	0	-	+	-	+	0	-	0
depreciate	.41	0	0	0	-	0	0	+	0	-	+
appease	-.32	0	-	-	+	-	0	0	0	0	0
refute	-.25	0	+	0	-	-	0	+	+	-	0
serve	-.18	0	0	0	+	0	-	-	0	0	0
Factor VIII											
	Loading				?					*	
court	.67	0	0	+	+	+	+	0	-	+	0
promise	.60	0	0	0	+	0	0	0	+	+	0
seduce	.38	-	0	0	0	+	+	+	0	-	+
refute	-.42	0	+	0	-	-	0	+	+	0	0
argue with	-.33	0	0	+	-	0	0	0	0	0	0
depreciate	-.24	0	0	0	-	0	0	+	0	-	+

17.33% of the total variance, is a Dynamism factor formed from the fusion of Potency and Activity. Factors V and VI are not clear, the former apparently being some fusion of the Terminal-Past-Associative features and the latter some fusion of the Supraordinate-Past-Dissociative features.

The factor analysis of the feature scaling task did seem to differentiate more features and in a clearer pattern than did the factor analyses of the verbs and adverbs in the IPV/AV intersection task. However, results reported by Osgood (1968) of factor analyses of data produced in the IPV/AV intersection task are quite comparable with the results obtained from the feature scaling task. Factor analysis of Osgood's own IPV/AV judgments clearly identified six features: Terminal fused with Potency and Activity; Associative/Dissociative; Ego-oriented/Alter-oriented; Supraordinate/Subordinate; Moral/Immoral; Deliberate/Impulsive. Analysis of college student data on the same task identified five features: Associative/Dissociative; Dynamism (fusion of Potency and Activity); Ego-oriented/Alter-oriented; Associative/Dissociative fused with Moral/Immoral. The results of the adverb analyses for these data indicate that the adverbs yield a Deliberate/Impulsive feature and a Terminal/Interterminal feature which the verb analysis did not produce. Otherwise the adverb analysis yielded features similar to the verb analysis.

Evaluation of factor analysis as a discovery procedure. There are some consistencies which appear in all the analyses of the IPV/AV intersection task and analysis of the feature scaling task. The Associative/Dissociative feature appears to be the most dominant in discriminating the interpersonal verbs; the Deliberate/Impulsive feature has some importance

in differentiating adverbs; several secondary features consistently appear in the analyses of the interpersonal verbs, a Dynamism factor fusing Potency and Activity; Supraordinate/Subordinate; Ego/Alter, Moral/Immoral. These secondary features tended to appear in combination with other features especially the Associative/Dissociative feature. It is interesting that the Initiating/Reacting feature showed up clearly in the verb analysis of the data reported here but did not in the data reported by Osgood (1968). It is clear that both with and without explicit instruction English speakers differentiate at least five or six of the ten a priori features. The failure of these analysis to yield all of the a priori features may be due to differential weighing of the features in terms of their significance in any semantic domain or may be due to errors in subjects' judgments -- and, of course, some of the features may be Osgoodian fictions. It is also possible that subjects may "weight" some features differently in making semantic judgments and that, as discussed above, the importance of the features relative to one another may shift with the word forms being judged. Osgood (1968) summarizes it this way: "It looks as if ordinary native speakers, when presented with interpersonal verb/adverb combinations, react primarily in terms of those features which are most salient to them in the given semantic domain. From the point of view of a performance model, this is not surprising. (p. 68)"

The failure of the factor analysis of the semantic-feature scaling task -- a test of the subjects' competence in using these features -- to yield all of the a priori features may reflect the failure of the measurement model assumed in factor analysis to match the "true" semantic model. The

assumptions about the semantic system made in this factor analytic measurement model are: (a) that the codings on the features are continuous; (b) that the interactions of word-meanings on features are continuous or algebraic; (c) that although the factors may be orthogonal, subjects' judgments of combination are based upon algebraic summations of signs across features, hence aggregate -- each single judgment thereby reflecting the influence of more than a single underlying feature.

The first author (1968) has proposed an alternative semantic feature theory which deliberately contrasts with the above measurement model in all major characteristics. Briefly, this model assumes: (a) that there is discrete (+, 0, -) coding on features; (b) that there is all-or-nothing resolution within features for word combinations (++ equals +; +0 equals +; -0 equals -; and +- equals nonsense or semantic anomaly); (c) that there is segregation (independence) across features. Forster and Osgood devised a computation procedure to fit these assumptions. This discrete method worked well for Osgood's a priori judgments, but when this feature method was applied to Illinois Student Subjects' data no interpretable features emerged.

The "true" semantic model probably lies somewhere between the extremes assumed by these two measurement models. Hierarchical ordering of features in terms of salience as well as intercorrelations among them apparently obscures the subjects semantic competence when they make acceptability judgments of word combinations, as in the IPV/AV intersection task.

A Test of Competence in Discriminating Semantic Features

A contingency analysis of the relations between a priori "expert" codings of each verb on each feature and the ratings of these verbs on the

feature-scales provides impressive evidence for the subjects' ability to discriminate among the features. The 7-point rating scale was tricotomized to correspond to the a priori ratings of +, 0 and -, mean judgments as extreme as or more extreme than plus 2 being coded +, mean judgments between plus 1 and minus 1 being coded 0, and mean judgments as extreme as or more extreme than minus 2 being coded -. Where distributions of mean judgments for a feature were sufficiently balanced, these absolute judgments were used in contingency analyses; where they were highly skewed, the subjects' ratings were divided into upper, middle and lower thirds. Table 8 summarizes these analyses, reporting numbers of words in corresponding cells (perfect agreements in the direction of coding), numbers of words in diametrically opposed cells (a priori coding having one sign, subjects giving opposed sign), and significance levels. The highly skewed distribution of the a priori codings of the Moral/Immoral and Active/Passive features in the 40 interpersonal verbs has already been noted, which prevented a contingency analysis of these features.

The features which emerged clearly in the factor analysis of these data, Associative/Dissociative, Ego/Alter, Supraordinate/Subordinate, Initiating/Reacting and Future/Past -- show agreement at the .001 level (i.e., one chance in a thousand of such agreement occurring by chance). Two features reach only the .05 level of significance, Potent/Impotent and Terminal/Interterminal, while one feature clearly does not show significant relation between the a priori codings and the subjects' codings -- Deliberate/Impulsive, radical disagreements between the a priori and subject codings (i.e., a plus versus a minus) almost never occurred. There was only one

Table 8

Significance Tests for Contingency Tables Relating A Priori Codings
to Subject Feature Scaling

FEATURE	WORDS IN + + and - - CELLS	WORDS IN + - and - + CELLS	SIGNIFICANCE LEVEL
Moral/Immoral	10	0	*
Potent/Impotent	10	0	.05
Active/Passive	11	0	*
Associative/Dissociative	24	0	.001
Initiating/Reacting	22	0	.001
Ego/Alter Orientation	21	0	.001
Supraordinate/Subordinate	22	1	.001
Terminal/Interterminal	14	0	.05
Future/Past Orientation	16	0	.001
Deliberate/Impulsive	14	3	.30 (ns.)

*Coefficients not computed because a priori codings too skewed for legitimate test.

notable exception - on the Supraordinate/Subordinate feature; defy is considered to be Subordinate by the authors but was rated Supraordinate by the subjects. We still think we are right!

This highly significant correspondance between the a priori coding and the subjects' scalings may appear trivial at first glance. After all, the subjects were given careful instruction on the meaning and use of the features; in effect, they were given our semantic rules. This correspondance would be trivial if these semantic features were explicitly tagged in word forms, as are nominal plurals, for example. But there are no such explicit markings for these features. Something about the meanings of the interpersonal verbs must be operating implicitly. If these interpersonal verb work-forms produced no semantic reactions which differentiated them in ways corresponding to the a priori features, then no amount of instruction would enable native speakers to make such fine and agreed-upon distinctions. We could not get such agreement on a feature that does not function in the semantic code for interpersonal verbs; for example, try to apply a Singular/Plural feature to these verb forms. Inapplicable features should result in random ratings when subjects are forced to use them.

The failure of a Deliberate/Impulsive feature to be discriminative in the scaling of the interpersonal verbs is puzzling, since this feature (or at least the Deliberate pole of it) was the dominant feature emerging in the factor analysis of the adverbs. A close examination of the contingency table shows that this is a unipolar feature for native speakers. If our absolute criterion is used, we find that 22 verbs were rated as

Deliberate, 18 verbs as 0, and none as - or Impulsive. For the 15 Deliberate a priori codings, the subjects agreed in 12 cases; they judged 7 of the 15 verbs given a priori neutral codings to be + or Deliberate; they judged 7 of the 10 verbs given minus or Impulsive a priori codings to be neutral (0) and the remaining 3 to be Deliberate (+). Even on this feature, there were only three radical oppositions between a priori and subject codings. The subjects' use of the Deliberate/Impulsive feature suggests that it represents at least one unipolar semantic feature, and there may be others.

Feature Clarity

It was noted above that the factor analytic results of the IPV/AV intersection and feature scaling tasks indicated that some of the a priori features have more importance or were given more weight than others. The question arises as to whether these features were discriminated with equal clarity in the feature scaling task. Table 9 gives the mean inter-subject Standard Deviations in the scaling of the ten a priori features for the 40 interpersonal verbs; the features are listed in order from the feature having the most inter-subject agreement in its use (smaller mean sigma) to the one having the least inter-subject agreement (larger mean sigma). The subjects showed the best agreement in their scaling of the Moral/Immoral, Supraordinate/Subordinate, Associative/Dissociative and Potent/Impotent features. They showed the poorest agreement in their scaling of the Initiating/Reacting, Terminal/Interterminal and Ego-oriented/Alter-oriented features. Note that the highest intersubject agreement is found for those features which have been most consistently identified in the factor analyses,

Table 9

Feature Clarity: Mean Inter-subject Standard Deviations in the
Scaling of the Ten A Priori features for 40 Interpersonal Verbs

Feature	Mean Standard Deviation
Moral/Immoral	.87
Supraordinate/Subordinate	1.06
Associative/Dissociative	1.11
Potent/Impotent	1.12
Future/Past	1.18
Active/Passive	1.21
Deliberate/Impulsive	1.29
Initiating/Reacting	1.41
Terminal/Interterminal	1.46
Ego-Oriented/Alter-oriented	1.55

while the features having the lowest inter-subject agreement were those which have been the least consistently identified in factor analyses.

Feature Discriminating Power

Table 10 gives the Standard Deviations of the mean scalings of the ten a priori features for the 40 interpersonal verbs; the features are listed from those having the most discriminative use (larger sigma) to those having the least discriminative use (smaller sigma). The features having the most discriminative use across the 40 interpersonal verbs are generally those displaying the highest inter-subject agreement in their use (Table 9) -- Moral/Immoral, Supraordinate/Subordinate and Associative/Dissociative. The features which discriminated poorest among the 40 verbs were, Future/Past, Deliberate/Impulsive and Terminal/Interterminal; these features also showing poor inter-subject agreement in their use. The Ego/Alter orientation feature seems to differentiate IPV meanings reasonably well, even though subjects have trouble applying it consistently.

In summary, various analyses of the feature scaling task show that subjects can use the a priori features to discriminate semantically among interpersonal verbs. The features are not equally discriminative, however; the Associative/Dissociative, Moral/Immoral and Supraordinate/Subordinate features are used more similarly by native speakers and discriminate among interpersonal verbs better than the other features. It should be noted that these features correspond to the dominant Evaluation and Potency factors found so regularly and universally in our cross-cultural studies of human meaning systems (cf., Osgood, 1964). The use of all points in the 7-point "feature" scales also suggest that semantic features are coded continuously rather than discretely.

Table 10

Feature Discriminating Power: Standard Deviations of the Mean Scalings of the Ten a priori Features for 40 Interpersonal Verbs

Feature	Standard Deviation
Associative/Dissociative	1.72
Supraordinate/Subordinate	1.39
Moral/Immoral	1.29
Initiating/Reacting	1.26
Potent/Impotent	1.14
Active/Passive	1.08
Ego-oriented/Alter-oriented	1.04
Future/Past	.87
Deliberate/Impulsive	.80
Terminal/Interterminal	.71

An Aid to Intuition--The Computer Tries The IPV/AV Intersection Task

Assigning the codings on the features to the strip codes of the verbs has been an entirely intuitive affair. Half-way through the analyses of the data reported above, the first author revised his original feature codings. This revision of the feature codings of the interpersonal verbs appears in Table 11. It is this version of the verb code strips which was used in Tables 6 and 7. However, some check on the "correctness" of these codings was needed, especially one which was independent of the coder's persuasive abilities relative to his co-workers. It was decided to use the computer as an objective check on the a priori feature codings. The question we put to the computer was, "can we make feature assignments such that the resulting V/AV intersections will agree with our intuitive judgments about the appositeness, anomaly or permissiveness of the combinations?" The computer was given an ordered set of rules which corresponded to the discrete feature theory described briefly above. The logic given to the computer can be summarized as follows:

Given some set of feature codings for two form classes, here interpersonal verbs and adverbs, compare each row (the strip code of each adverb) in the adverb matrix with the first row (verb strip code) of the verb matrix; repeat until all verb rows are exhausted. One of three decisions must be made for each pair of strip codes according to the ordered rules: (1) if + and - occur in the same column, judge - or anomalous; (2) if the conditions for (1) are not fulfilled and the same sign (+ or -) occurs in the same column, judge + or apposite; (3) if the conditions for (1) and (2) are not fulfilled, judge 0 or permissible.

the semantic model that the computer is using, it will be recalled, assumes discrete (+, 0, -) coding on the features and segregation across the features, one +- combination being enough to produce an anomalous judgment

Table 11

Revision of the A Priori Feature Codings for the 40 Interpersonal Verbs

	Moral- A Immoral	Potent- B Impotent	Active- C Passive	Associa- tive Disso- ciative D	Initiating Reacting E	Ego- F Alter	Supra- ordinate Sub- ordinate G	Terminal Interterminal H	Future Past I	Deliberate Impulsive J
Accept	0	0	-	+	-	0	0	0	0	0
Advise	0	0	0	0	+	-	0	0	+	+
Ambush	-	0	0	-	+	+	0	+	0	+
Appease	0	-	-	+	-	0	0	0	0	0
Argue with	0	0	+	-	0	0	0	0	0	0
Be submissive to	0	-	-	0	-	-	-	-	0	0
Betray	-	0	0	-	+	0	0	+	-	+
Bully	-	+	+	-	+	0	+	0	0	0
Cheat	-	0	0	-	+	+	0	0	0	+
Complete with	0	0	+	0	0	+	0	-	+	0
Confess to	+	0	0	0	0	0	-	+	-	0
Confide to	0	-	0	+	+	+	0	+	-	0
Confine	0	0	0	-	0	0	+	-	0	+
Confuse	0	0	0	0	+	-	0	0	0	0
Console	+	0	0	+	-	-	0	0	-	-
Convert	0	0	0	0	+	-	+	+	+	0
Court	0	0	+	+	+	+	0	-	+	0
Defy	0	+	+	-	-	+	0	0	+	-
Depreciate	0	0	0	-	0	0	+	0	-	+
Disregard	0	0	-	-	-	0	0	-	0	+
Distress	0	0	0	-	+	-	0	0	0	0
Embarrass	0	0	0	-	+	-	+	0	-	0
Evade	0	-	+	-	-	+	0	0	0	0

Table 11 (continued)

	Moral A Immoral	Potent B Impotent	Active- C Passive	Associa- tively D Dissocia- tive	Initiating E Reacting	Ego- F Alter	Supra- ordinate G Sub- ordinate	Terminal- H interterminal	Future- I Past	Deliberate- J Impulsive
Exclude	0	0	-	-	0	0	+	0	0	0
Harrass	-	+	+	-	+	-	0	-	0	0
Hold contempt for	0	+	0	0	-	-	+	-	-	0
Molest	-	+	+	-	+	0	+	0	0	0
Obey	0	-	0	0	-	0	-	0	0	0
Pay attention to	0	0	0	0	-	0	0	0	0	+
Plead with	0	0	0	0	+	+	-	0	+	0
Promise	0	0	0	+	0	0	0	+	+	0
Reassure	0	+	0	+	-	-	+	+	-	0
Reform	+	0	0	0	+	-	+	0	0	+
Refute	0	+	0	-	-	0	+	+	-	0
Resist	0	0	0	-	-	+	0	-	+	0
Seduce	-	0	0	0	+	+	+	0	+	+
Serve	0	0	0	+	0	-	-	0	0	0
Share with	0	0	0	+	0	0	0	-	0	0
Spurn	0	+	+	-	-	0	+	+	0	-
Train	0	0	0	0	+	-	+	-	+	+

regardless of the number of matching pairs. And further, several matching pairs do not make the verb-adverb pair "more" apposite.

The computer was also asked to count the number of features where the verb and adverb had (a) the same sign, (b) opposed signs or (c) 0 with some other sign (+, -). Instructions on the use of the program and the Fortran IV program appear in Appendix B. The program's output appears as follows:

	Code	Sum opposite	Sum permissible	Sum anomaly
1 accept - 1 adamantly	0	0	6	0
1 accept - 2 boldly	-	0	5	1
1 accept - 3 brutally	-	0	5	2

The computerized IPV/AV intersection task allows the coder to test his feature assignments with a "subject" that remains perfectly faithful to the feature codings and the assumptions of the discrete feature model. The coder can systematically inspect how well his a priori feature assignments produce judgments which agree with his own intuitions about the acceptability of the verb-adverb pairs.

The feature codings shown in Table 11 for the verbs and Table 4 for the adverbs were put to the computer judgment test. Many counter-intuitive judgments resulted: for example, in the sample of the print-out above, accept-adamantly was "judged" permissible where intuitively it should be anomalous. Five of the verbs did not appear to be true interpersonal intentions and were eliminated: Ambush and confine were eliminated because they are not intentions but actions; the verbs confuse, distress and embarrass were eliminated because they describe recipient states rather than actor intentions.⁴ The adverb willingly was omitted

⁴ Each of these verbs fits into the following test frame: A made B v-state, e.g., A made B confused; true interpersonal verbs will not fit into these frames; e.g., *A made B molested.

because it involves an ambiguous third person reference -- Person A may almost-any-verb (attack, plead with, train) Person B willingly, for Person C's sake. The feature codings of the remaining adverbs and verbs were then revised with the results shown in Table 12 for the adverbs and Table 13 for the verbs. These new codings were put to the computer test. The resulting judgments for the IPV-AV pairs fit the authors' intuitive judgments quite closely; only 136 of the total 1,050 "judgments" made by the computer did not agree with our intuitions and of these 136, only 22 were cases where what the computer "judged" to be apposite were intuitively anomalous or vice versa.

The kinds of coding changes which could be made fell into three classes: changing a sign to zero, changing a zero to a sign, and changing a sign to the reverse sign; the latter shift representing a complete reversal in the meaning of a word for a feature. There were a total of 67 coding changes made prior to the second computer test; within the verb class, 3 shifts were made from a sign to zero, 37 changed a zero to a sign, and there were no shifts from one sign to the other; within the adverb class, there were 10 shifts of a sign to zero, 17 shifts of a zero to a sign, and again there were no changes from one sign to the other. It appears that the original codings were close enough so that only half-step shifts in the codings were required, it also appears that the first author's first recoding of the verbs (Table 1 to Table 11) had led to a too "sparse" semantic coding of the verbs, since most of the shifts subsequent to the computer test were to change a zero to a sign.

Table 12

Revision of Adverb Feature Codings

	Moral- Immoral	Potent- Impotent	Active- Passive	Associative- Dissociative	Initiating- Reacting	Ego- Alter	Supraordinate- Subordinate	Terminal Interterminal	Future- Past	Deliberate- Impulsive
	A	B	C	D	E	F	G	H	I	J
Adamantly	0	+	0	0	0	+	+	-	0	0
Boldly	0	+	0	0	0	+	0	0	0	-
Brutally	-	+	+	-	0	-	+	0	0	0
Carefully	0	0	0	0	0	0	0	0	+	+
Confidently	0	0	0	0	0	0	+	0	+	0
Contemptuously	0	0	0	-	0	0	+	0	0	0
Deceitfully	-	0	0	0	0	0	-	0	0	+
Faithfully	+	0	0	+	-	0	0	-	0	0
Flagrantly	-	0	+	0	0	0	0	0	0	0
Furtively	-	-	0	-	0	0	-	0	0	+
Generously	+	0	0	+	0	-	0	0	0	-
Heatedly	0	+	+	0	0	+	0	+	0	-
Hopefully	0	0	0	0	0	0	0	-	+	0
Humbly	+	-	0	0	0	0	-	0	0	0
Incessantly	0	0	+	0	+	0	0	-	0	0
Meanly	-	0	0	-	0	0	0	0	0	0
Meekly	0	-	0	0	0	0	-	0	0	-

Table 13

Second Revision of the Verb Feature Codings

	Moral- Immoral	Potent- Impotent	Active- Passive	Associative- Dissociative	Initiating- Reacting	Ego- Alter	Supraordinate- Subordinate	Terminal- Interterminal	Future- Past	Deliberate- Impulsive
	A	B	C	D	E	F	G	H	I	J
Accept	0	-	-	+	-	0	0	+	0	0
Advise	+	0	0	0	0	-	+	0	+	+
Appease	0	-	-	+	-	0	0	0	0	-
Argue with	0	0	+	-	0	+	+	0	0	0
Be Submissive to	0	-	-	+	-	0	-	-	0	0
Betray	-	0	-	-	+	0	0	+	-	+
Bully	-	+	+	-	+	-	+	0	0	-
Cheat	-	-	0	-	+	+	0	0	0	+
Compete with	0	0	+	-	0	+	0	-	+	0
Confess to	+	-	0	0	0	+	-	+	-	0
Confide to	0	-	0	+	+	+	0	+	-	0
Console	+	0	-	+	-	-	0	0	-	-
Convert	+	0	0	0	+	-	+	+	+	0
Court	0	0	+	+	+	+	0	-	+	0
Defy	0	+	+	-	-	+	0	0	+	-
Depreciate	-	-	0	-	0	0	+	0	-	+
Disregard	0	0	-	-	-	+	+	-	0	+
Evade	0	-	+	-	-	+	-	0	0	0

Table 13 (continued)

	Moral- Immoral	Potent- Impotent	Active- Passive	Associative- Dis sociative	Initiating- Reacting	Ego- Alter	Supraordinate- Subordinate	Terminal- Interminal	Future- Past	Deliberate- Impulsive
	A	B	C	D	E	F	G	H	I	J
Exclude	0	0	-	-	0	0	+	0	0	0
Harrass	-	+	+	-	+	0	0	-	0	0
Hold Contempt for	0	+	0	-	-	-	+	-	-	-
Molest	-	+	+	-	+	0	+	0	0	0
ObeY	0	-	0	+	-	0	-	0	0	0
Pay Attention to	0	-	0	0	-	0	0	0	0	+
Plead With	0	-	0	+	+	+	-	0	+	0
Promise	0	0	0	+	0	0	0	+	+	-
Reassure	0	+	0	+	-	-	+	+	-	-
Reform	+	0	0	0	+	-	+	0	0	+
Refute	0	+	0	-	-	0	+	+	-	0
Resist	+	+	0	-	-	+	0	-	+	0
Seduce	-	-	0	0	+	+	+	0	+	+
Serve	0	0	0	+	0	-	-	0	0	0
Share with	0	-	0	+	0	0	0	-	0	0
Spurn	0	+	+	-	-	0	+	+	0	-
Train	+	0	0	0	+	-	+	-	+	+

Table 14 gives the frequency of these coding shifts for each of the ten a priori features; the frequencies within each of the form classes is also indicated. The most frequently recoded feature were the Potent/Impotent and Ego/Alter features, while the least recoded were the Terminal/Interterminal, Future/Past and Active/Passive features. In general, more coding shifts were made for the verbs than for the adverbs. The verbs received relatively more recoding in the Potent/Impotent and Deliberate/Impulsive features, while the adverbs received more recoding in the Initiating/Reacting feature. The exact feature recodings for the verbs and adverbs appear in Table 15.

Our efforts at recoding the features of these verbs and adverbs stopped here, but not without some feeling of satisfaction that these codings and the discrete model were able to replicate our intuitions quite closely.⁵ The remaining errors may be either the result of improper coding or the failure of the discrete model to match the native speakers "true" semantic model. Many questions remain unresolved, of course. For example, are the feature codings discrete or continuous, or may they be either? Do features really operate independently or do they interact in some manner?

⁵ A few coding changes--made to resolve intuitively unsatisfying "judgments" of V/AU combinations by the computer--still do not satisfy the first author's intuitions about the meanings of the individual words. He does not feel that advise, resist and train are + Moral behaviors (should be 0, as originally coded), that behaving wisely is + Moral (should be 0), that behaving boldly is neutral on Initiating/Reacting (should be +), that behaving furtively is neutral on Future/Past (should be +) or that behaving sympathetically is neutral on Deliberate/Impulsive (should be -).

Table 14

Frequency of changes of Semantic Coding of the Verbs and Adverbs
for each of the A Priori features Following the First Computer
Judgment Test

Feature	Verb	Frequency Coding Changed	
		Adverb	Total
A Moral/Immoral	5	2	7
B Potent/Impotent	9	1	10
C Active/Passive	2	2	4
D Associative/Dissociative	5	3	8
E Initiating/Reacting	1	6	7
F Ego/Alter	6	7	13
G Supraordinate/Subordinate	5	3	8
H Terminal/Interterminal	1	0	1
I Future/Past	1	2	3
J Deliberate/Impulsive	5	1	6
Total Changes	40	27	67

Table 15

Nature of Changes in Semantic Codings of the Interpersonal Verbs
and Adverbs Following the First Computer Judgment Test

I P V	Feature									
	Moral- Immoral A	Potent- Impotent B	Active- Passive C	Associative- Dissociative D	Initiating- Reacting E	Ego- Alter F	Supraordinate- Subordinate G	Terminal- Interterminal H	Future- Past I	Deliberate- Impulsive J
accept		0 → -						0 → +		
advise	0 → +				+ → 0		0 → +			
appease										0 → -
argue with						0 → +	0 → +			
be submissive to				0 → +		- → 0				
betray			0 → -							
bully						0 → -				0 → -
cheat		0 → -								
compete with				0 → -						
confess to		0 → -				0 → +				
console			0 → -							
convert	0 → +									
court										
defy										
depreciate	0 → -	0 → -								
disregard						0 → +	0 → +			

How does the differential weighing or salience of the features affect judgments in the word-form intersection tasks? It is clear, however, that with the aid of the computer, modifications in coding words on Semantic Features -- either following the discrete model or other models-- may be tested against the actual intuitions of native speakers. We are at least one step beyond pure intuitions about meanings and perhaps a step toward computerized lexicography.

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13. ABSTRACT

The present paper extends and further validates Osgood's model of interpersonal intentions as represented in ten a priori Semantic Features. This model and several cross-cultural implications are discussed.

Several empirical tests were made of the perception and use of these a priori Semantic Features for Interpersonal Verbs by native speakers from the American Midwest subculture. The results showed that with or without instruction, English speakers differentiated five or six of the ten a priori features. The features received different stress depending upon the form class, verb or adverb; morality and deliberateness was stressed in the adverb factors, while different types of association were stressed in the verb factors. Also, the features emerging in the adverb analysis tended to be unipolar, while the verbs produced bipolar features. Various analyses of a features scaling task show that subjects can use the a priori features to discriminate semantically among interpersonal verbs and do so with almost total agreement with prior feature ratings made for each verb by the authors.

Finally, a computerized aid to checking intuitive judgments about the feature specification of verbs and adverbs and models of semantic systems is described.

14. KEY WORDS:

Interpersonal Behavior
Interpersonal Intentions
Semantic Feature
Interpersonal Verb
Semantic Game
Interpersonal Verb/Adverb Intersection Task
Semantic Feature Scaling Task
Anomalous
Apposite
Permissible
Discrete Feature Theory
Computerized IPV/AV Intersection Task

APPENDIX A

Figure 1

3

3

4

2

Now we give definitions of the 10 features as we have used them ourselves along with our own differentiation of the intention to help as a general illustration. Of course, you may disagree with some of our judgments, but that is your privilege as an independent native speaker of English.

I. DELIBERATE vs. IMPULSIVE feature: If the intent of person A is calculated, planned and voluntary with respect to behaving toward person B, it is to some degree Deliberate; if it is uncalculated, unplanned and involuntary, then it is to some degree Impulsive. (EXAMPLES: guide/inspire, assist/pay homage to, borrow from/beq.)

to help

Deliberate ____:____:____: X:____:____:____ Impulsive

II. MORAL vs. IMMORAL feature: If the intent of person A toward person B would be judged ethical by an impartial observer, then it is to some degree Moral; if it would be judged unethical by an impartial observer, then it is to some degree Immoral. (EXAMPLES: exalt/humiliate, reason with/dictate to, protect/deceive.)

to help

Moral ____:____: X:____:____:____ Immoral

III. SUPRAORDINATE vs. SUBORDINATE feature. If the intent of person A is to express superior status with respect to person B, then it is to some degree Supraordinate; if it is to express inferior status with respect to person B, it is to some degree Subordinate. (EXAMPLES: protect/assist, demand/comply, lead/follow.)

to help

Supraordinate ____:____: X :____:____:____:____ Subordinate

IV. FUTURE vs. PAST ORIENTATION feature. If the intent of person A with respect to person B is concerned with some future condition or event, it is to some degree Future Oriented; if it is concerned with some past condition or event, it is to some degree Past Oriented. (EXAMPLES: pledge/apologize, persuade/remind, enlist the support of/reciprocate.)

to help

Future Oriented ____: X :____:____:____:____ Past Oriented

V. POTENT vs. IMPOTENT feature. If the intent of person A toward person B implies large amounts of energy or effort or potential energy or effort on the part of A, then it is to some degree Potent; if it implies small amounts of energy or effort on A's part, it is to some degree Impotent. (EXAMPLES: support/apologize, punish/rebuke, challenge/question.)

to help

Potent ____:____:____:____: X :____:____ Impotent

VI. INITIATING vs. REACTING feature. If the intent of person A is to elicit some response from person B, then it is to some degree Initiating; if it is to respond to some prior behavior of B, then it is to some degree Reacting. (EXAMPLES: cheer up/congratulate, persuade/disuade, provoke/frustrate.)

to help

Initiating ____:____:____:____:____: X ____ Reacting

VII. ASSOCIATIVE vs. DISSOCIATIVE feature. If the intent of person A is to decrease tension with respect to B, then it is to some degree Associative; if it is to increase tension with respect to B it is to some degree Dissociative. (EXAMPLES: support/blame, invite/reject, compliment/insult.)

to help

Associative X ____:____:____:____:____:____: ____ Dissociative

VIII. TERMINAL vs. INTERMINAL feature. If the intention of person A with respect to person B has a clear-cut beginning or ending in time and is reasonably brief, then it is Terminal; if it has no clear-cut beginning or ending in time and is reasonably prolonged, it is Interterminal. (EXAMPLES: unite with/associate with, praise/admire, inform/supervise.)

to help

Terminal ____:____:____: X ____:____:____: ____ Interterminal

IX. EGO vs. ALTER ORIENTED feature. If the intent of person A is to change his own state of affairs via his behavior toward person B, then it is Ego-oriented; if it is to change B's state of affairs via his behavior toward B, then it is Alter-oriented. (EXAMPLES: enlist support of/cheer up, impress/inform, exploit/corrupt.)

to help

Ego-oriented ____:____:____:____:____:____: X Alter-oriented

X. ACTIVE vs. PASSIVE feature. If the intent of person A toward person B implies a high rate or variety of actions on the part of A, then it is Active; if it implies a low rate or variety of actions on the part of A, then it is Passive. (EXAMPLES: retaliate/resist, manipulate/profit from, take care of/be responsible for.)

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Active ____:____: X :____:____:____:____ Passive

You may wish to refer back to these definitions and examples as you proceed with the task.

19. TO CONFESS TO

- I. Deliberate: : : : : : : : Impulsive
 3 2 1 0 1 2 3
- II. Moral : : : : : : : : Immoral
 3 2 1 0 1 2 3
- III. Supraordinate: : : : : : : : Subordinate
 3 2 1 0 1 2 3
- IV Future : : : : : : : : Past Oriented
Oriented 3 2 1 0 1 2 3
- V. Potent : : : : : : : : Impotent
 3 2 1 0 1 2 3
- VI. Initiating: : : : : : : : Reacting
 3 2 1 0 1 2 3
- VII. Associative: : : : : : : : Dissociative
 3 2 1 0 1 2 3
- VIII. Terminal : : : : : : : : Interterminal
 3 2 1 0 1 2 3
- IX. Ego- : : : : : : : : Alter-oriented
oriented 3 2 1 0 1 2 3
- X. Active : : : : : : : : Passive
 3 2 1 0 1 2 3

APPENDIX B

PROGRAM

Discrete Feature Theory Predictions for Word-Modifier Combinations

Programed by: William Love, Psychology Computer Consultant, and
Judith Ayer, April 2, 1968

Type: Fortran IV for 7094 computer

Purpose: The program generates predictions of judgements of appositeness, permissibility or anomaly from comparisons of feature code strips of words (nouns, verbs) and their modifier (adverbs, adjectives) according to the discrete semantic feature model. In this model one case of matching signs yields an apposite (+) judgement; one case of opposing signs yields an anomalous (-) judgement, and all combinations of some coding with a zero coding yields a permissible (0) judgement for the pair of words. The program also gives a frequency count for each class of judgements for each word pair; double zero codings are not counted. Finally, the +, -, and 0 judgement of each word with each modifier will be punched on cards according to a verb i adverb matrix for comparison with actual data.

Description: This program reads two matrices from cards; for example, one matrix is the feature codings of interpersonal verbs and the other is feature codings of adverbs. The format for the two matrices is supplied by the user. The program compares each row (verb) of the first matrix with each row (adverb) of the second and develops a code (judgement of +, 0, -) as well as the total number of apposite, opposite, and anomalous feature pairs. The user not only has the

option of supplying the format for the cards to be read in, but also may request that the code be punched out in a specified format. Cards will be punched with a name from the second matrix (main class - verbs, nouns) and the codes that go with that row (word) of the second matrix and each of the rows of the first matrix; e.g. judgements of apposite, permissible, anomalous for each verb with each adverb. The user also supplies the name of each matrix (i.e. adverb - verb). There is also an option for description cards to be printed with the computer output.

Parameters

The data cards should follow the pattern:

1. ID (according to current DCL format)
2. Program deck
3. General parameter card:

This card should have the following code:

Columns

- | | |
|----------|---|
| 1-2-3 | number of rows of first matrix - modifying word class - adverbs, adjectives |
| 4-5-6 | number of rows of second matrix - main word class - verbs, nouns |
| 7-8-9 | number of description cards - E's comments about the test or data |
| 10-11-12 | number of columns of the two matrices - number of features to be compared must be same for each word class |
| 13-14-15 | 1 if want to punch output, apposite (+), anomalous (-), or permissible (0) for each main word with each modifier, 0 or blank otherwise. |
4. Description cards. Any practical number of description cards may be used. If no description is desired insert no cards.

5. Names of the two matrices. This card should have the name of the second matrix in columns 1-16 (e.g. IP Verbs or Nouns) and the name of the first matrix in columns 17-32 (e.g. Adverb, Adjective).
6. Format for input cards: All input cards must have a word associated with each row and this must appear in the first 16 columns; thus the format must begin with 4A4. The format may take any or all of the 80 columns of a data card. The card is punched like any format statement with the statement number and the word "format" left off; for example: (4A4, 10I2) might be punched in columns 1-11. All pluses, minuses, and zeros must be read in I Format (+ = +1, - = -1, 0 = _0). All formats must begin with 4A4.
7. Format for punched output: If no punched output is desired this card should be left out. If punched output is desired, the computer will punch a row name of the second matrix (main word class and its code with each row of the first matrix (modifier). The required format begins I2, 4A4 which punches a word number and the word, and the code must also be in A format, for example, (I2, 4A4, 30A1) when there are 30 modifiers.
8. Data deck: Punched according to format described in 6 above.

Limitations:

1. The first matrix may be no larger than 100 rows (main class words) and 50 columns (features).
2. The second matrix may have 50 columns (features) and an infinite number of rows (modifiers).
3. There may be an infinite number of description cards.
4. All names must take 16 columns and be read in and out with 4A4 format.

Further Possibilities of Program

1. The maximum size of the two matrices may be changed within limitations.
2. This program may be changed to run on an IBM 360 by changing the control cards and changing input output tape numbers.
(In process).